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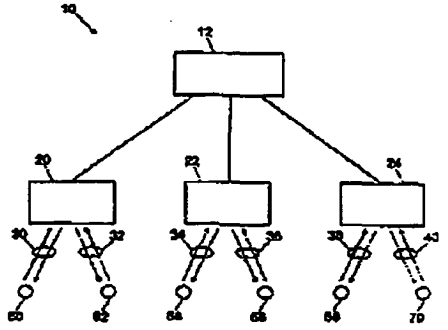
(54)【発明の名称】 無線通信の動的チャネル割当方法と装置

(57)【要約】

【目的】 無線通信システムにおける周波数チャネルの有効な使用技術を提供する。

【構成】 無線通信における無線スペクトルの効率的な使用技術に関するものである。特定の基地局およびその近傍局に関するチャネル占有データおよびチャネル使用可能データを、移動ユニットおよび/または基地局に周波数チャネルを割り当てるために使用される。チャネル占有および利用可能データは、基地局20、22、24あるいは移動切換センター12に位置している。チャネルは好ましくはチャネル対として割り当てられる。



[JP, 07-203531, A]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to the field of radio. Especially, it is related with efficient use of the radio frequency spectrum by the radio communication equipment.
[0002]
[Description of the Prior Art] Typically, a radio network is constituted including a move change pin center,large (move relay pin center,large), a base station, and movement/pocket unit ("move unit"). Typically, hard wiring of the base station is carried out to the move change pin cent r,large through a communication wire like an optical communication wire. Each base station offers the coverage of a move unit in the specific field called "cell." When a move unit is in a specific cell and access is required, the base station of the cell assigns a frequency channel pair to the move unit concerned. A frequency channel pair consists of an "up link" frequency channel used in order to transmit a signal to a base stati n from a move unit, and a "down link" used in order to receive a signal from a base station in a move unit. The frequency pair assigned to the specific move unit is considered to be a single frequency channel, and is described by this contractor such. A move unit like a cellular phone can communicate with other move units or the unit by which hard wiring was carried out through communication with the base station.
[0003] Use of move unit radio communication equipments, such as a cellular phone, an individual communication network (PCN), radio branch exchange (PBX's), and a radio station section zone network (LANs), is increasing gradually. However, the radio frequency spectrum currently used for radio consists of finite numbers of a frequency channel in indispensable. The various channel quota technology for a deployment of these limited resources is adopted. Dynamic channel assignment (DCA) is a wide sense technology [for using a radio frequency spectrum effectively / some] title. In this DCA technology, the channel pair is not beforehand assigned to a base station. Grouping of the present DCA technology is carried out to two criteria, i.e., traffic application, and interference application. "Timid", "Agressive", and a "m-Persistent Polite Aggressive (m-PPA)" system are the examples of an interference applied technology. Moreover, since a move unit permits making a decision about channel assignment, such technology is called distribution technology.
[0004] in "Timid" technology, when it is shown that the move unit which measures the level of the interference signal on a channel pair, is alike in the specific field where this level is called "proximity", and uses the channel pair is not in a move unit, it supplements with the channel pair when a move unit cannot find the channel pair which is not used in "Aggressive" technology, a "supplementary" signal is transmitted to the channel

which shows that the interferenc level is using the channel pair to which only other one move unit corresponds in proximity of the move unit concerned with which it supplements Other distributed move units receiv a "supplementary" signal, and look for other channel pairs. Although "m-PPA" technology is the same as "Aggressive" technology, when the distributed move unit cannot look for other usable channel pairs, the move unit with which it supplemented releases the channel pair with which it supplemented, and looks for other channel pairs. In order to determine which pair can be tried in order to operate well "Timid", "Aggressive", or "m-PPA" technology, a move unit measures all channel pairs. This is realizable. furthermore — the time of a certain move unit blocking other units — being concerned — others — since a unit starts change which occupancy of a channel pair followed, "Aggressive" technology may become less stable

[0005] Although it will be thought that the best result is obtained if "m-PPA" technology is used, this technology also has a fault. Delay by judging whether the distributed move unit was able to find other channel pairs is not satisfactory. In addition, since many trial for the supplement of a channel pair is performed by many move units through a radio network, the interference level on many channels will become dissatisfied. In traffic application DCA technology, based on the actual data about the usage of a channel pair by the move unit, a channel pair is assigned to a move unit or is occupied. Although interference signal level does not need to be measured in traffic application, the report of the data about th actual usage of a channel pair is needed. The maximum packing DCA (MP DCA) is the optimum conditions on the theory for a traffic appli d technology. MP In DCA, it is determined by the centralized information which frequency channel pair is used by all the move units in a network. Whenever it requires the frequency channel for communication of each channel pair, the best possible quota proposal is determined, and all chann l pair assignment is updated. MP In DCA, almost unrealizable centralized adjustment and wide range information are needed very much in the network equipped with many channels and cells.

[0006]

[Problem(s) to be Solved by the Invention] The purpose of this invention is to offer the effective used technology of the frequency channel in a radio communications system. Other purposes of this invention are to offer the dynamic channel quota technology which does not cause the remarkable delay at the time of setting up a call or communication between a base station and a move unit. Other purposes of this invention have the amount of interference in offering the dynamic channel quota technology which is the minimum. Other purposes of this invention are to offer the effective traffic applied technology for channel assignment.

[0007]

[Means for Solving the Problem] The above-mentioned purpose and other above-mentioned features are based on one example of this invention which offers the occupancy of a channel pair for the base station in each base station, and its approaching base station, and the data of a channel pair which can be used, and can be attained. The approaching base station can use for and specify the reuse restraint buffer of for example, one c ll or two cells. Data are preferably offered in the form of an increased type channel pair occupancy (ACO) table. In this example, the data which can be channel pair used [channel pair occupancy and] are used in order to assign the move unit which requires a frequency channel pair. The data in a table are changed based on the approaching data which were received from the base station and which can be channel pair used [channel pair occupancy and].

[0008] Dynamic channel assignment is attained by other examples of this invention by assigning the base station and move unit which offer the data which can be channel pair used [channel pair occupancy and] in a move change pin center,large, and require a channel pair using this data. With other composition of this invention, the data about the channel pair to the channel pair occupancy and the base station by the base station which can be used are transmitted to the approaching base station from a base station. In other examples, in order that the data which can be

channel pair us d [channel pair occupancy and] may be offered in the form of a multiplex table where it is located in a singl move change pin center,large and this data may assign a channel pair to a bas station and a move unit, it is used. With other forms of this invention, the same data are offered on the combined table which is located in a single move change pin center,large, and in order that this data may assign a channel pair to a base station and a move unit, it is used.

[0009]

[Example] two or more base stations which contain the move change pin center,large 12, base stations 20 and 22, and 24 in drawing 1 , and a frequency channel pair -- the simplified radio network 10 which consists of 30, 32, 34, 36, 38, 40, move units 60, 62, 64, 66, and 68, and 70 was shown a base station 20 -- a frequency channel pair -- it is indicated that it communicates with the move units 60 and 62 through 30 and 32, respectively a base station 22 -- a frequency channel pair -- it is indicated that it communicates with the move units 64 and 66 through 34 and 36, respectively a base station 24 -- a frequency channel pair -- it is indicated that it communicates with the move units 68 and 70 through 38 and 40, respectively A move unit requires access to the frequency channel pair about the frequency channel to demand, and when it can access, a frequency channel pair is assigned.

[0010] If a suitable a channel pair or multiple pair can be used, a move unit like the move unit 60 can communicate with other units connected with other move units of the network 10 interior, or the move change pin center,large 12 by hard wiring. Each base station is connected with the move change pin center,large 12 by hard wiring. You may connect to the move change pin center,large 12 similarly other equipments which are not illustrated by hard wiring. The still more detailed composition of the base station network 110 and base stations 112 and 126 which were simplified to drawing 2 , 3 and 4A, and 4B was shown. The concept of the base station which approached is shown in these drawings again. Subsequently the component of a drawing explains the outline in detail in relation to the dynamic channel quota equipment and the method of this invention first.

[0011] The base station network 110 of drawing 2 includes base stations 112, 120, 122, 124, 126, 128, 130, 132, 134, and 136. Hard wiring of these base stations is carried out to a move change pin center,large typically like the move change pin center,large 12 shown in drawing 1 . This base station network 110 includes two or more base stations beyond hundreds, thousands, or it of the others which are not illustrated. Each base station has the base station which adjoins it, and the base station specified as a "contiguity" base station in this example. For example, a base station 112 has the approaching base stations 120, 122, 124, 126, 128, and 130, and the base station 126 has the approaching base stations 112, 124, 128, 132, 134, and 136. In the base station network 110 where drawing 2 was simplified, it is not permitted that what frequency channel pair currently used for either of the approaching base station is used for each base station. In this case, a "contiguity office" is specified as a base station contiguous to other base stations. For example, it is not permitted that a base station 112 uses what frequency channel pair currently used by base stations 120, 122, 124, 126, 128, and 130. This restraint is known as reuse restraint of 1 cell buffer. Simultaneous use of the frequency channel by a certain base station and its approaching base station causes the result it becomes inadequate communicating between a move unit and a base station.

[0012] The above-mentioned 1 cell reuse restraint is model, and in order to specify a "contiguity office", more advanced reuse restraint like two cells is used. Similarly for 2 cell reuse restraint the frequency channel currently used by base stations 132, 134, or 136 is not used for a base station 112. Therefore, for 2 cell reuse restraint, base stations 132, 134, and 136 will be included in the base station "it approaches in". [of a base station 112]

[0013] Drawing 3 shows the more detailed diagram of a base station 112, and this base station 112 has a receiving antenna 212, the transmitting

antenna 214, a band pass filter 216, armatur -voltage control type VCO 218, amplifier 220, a processor 224, an output port 226, input port 228, and storage 230, and is constituted. An output port 226 and input port 22 l t a communication wire pass, and hard wiring is carried out to a move change pin center,large like the move change pin center,large 12 of drawing 1 . Armature-voltage control type VCO 218 has the data signal input line 222. The processor 224 contains the control lines 221 and 223, the data signal input line 225, and the data signal output line 227 further. Input port 226 and an output port 228 can also combine these with single bidirectional input / output port again. General operation in communication with the move unit of a base station like a base station 112 is explained below. A processor 224 inspects the data storage means 230, in order to determine which channel pair is assigned to the base station 12, and it performs predetermined cycle operation through the assigned channel pair which is communicating with the move unit which subsequently corresponds.

[0014] For example, when channel pair "B" is assigned to the first move unit, a processor 224 lets the control line 221 pass, and adjusts a band pass filter 216 to the up link frequency channel of channel pair "B." When the signal which has the up link frequency concerned from a move unit by the receiving antenna 212 is received, the signal passes a band pass filter 216, is amplified by amplifier 220, and is sent to a processor 224. The processor 224 has equipment like the analog-to-digital converter which changes into a digital signal preferably the analog signal received by the receiving antenna 212. Subsequently, in the technical field concerned, it is directly transmitted to other move units from a base station, or a digital signal is sent to a move change pin center,large from a base station, and is sent to the move unit or the equipment by which hard wiring was carried out of further others so that it may be well-known.

[0015] In order to transmit a signal to a move unit, a processor 224 lets the control line 223 pass, and, in the case of the frequency channel pair which was able to assign armature-voltage control type VCO 218, and this example, sets it to the down link frequency of channel pair "B." Subsequently to the output-line 227 top of the data signal, a processor 224 outputs a digital signal. It is received in the input 222 of the data signal of armature-voltage control type VCO 218, and these digital signals correspond to whether the digital signal of either "1" or "0" is outputted, respectively, and make this VCO suspend or maintain. Other well-known technology for transmitting a digital signal is used similarly. A processor 224 can change a received-frequency channel into different frequency by only adjusting a band pass filter 216. In order that a proc ssor 224 may change the frequency of armature-voltage control type VCO 218, a transmit-frequencies channel can be changed by changing the control signal on the control line 223. A processor 224 is carried out in this way, and in order that a base station may permit communicating with two or more move units, it can communicate through two or more frequency channel pairs.

[0016] Alternatively, two or more transmitting antenna and two or more receiving antennas can also be prepared so that it may be well-known in this work field. Each transmitting antenna is combinable with the filter or VCO set up in order to transmit specific frequency. Each receiver is combinable with a filter, in order to set up specific frequency. By having two or more transmitters and receivers, a processor can communicate with two or more move units simultaneously substantially. The single transmitting antenna which similarly was connected with the single receiving antenna connected with two or more filters, two or more filters, or VCO can be used.

[0017] Drawing 4 A and 4B show the typical increased type channel pair occupancy (ACO) tables 300 and 310 for the base stations 112 and 126 of ******** drawing 2 . The format of both the ACOs tables 300 and 310 is the same, and the general publication of the mold of the information offered is explained with reference to the ACO table 300. The ACO table 300 is located in the storage 230 of drawing 3 . This ACO table 300 contains the channel pair occupancy data 302 for the known office 112, its approaching known offices 120, 122, 124, and 128, and 130, and the data which can be channel pair used. Here, the "proximity office" is prescribed by 1 cell buffer or 1 base buffer reuse restraint. The channel pair occupancy data 302 show whether the specific base station is using one of the eight channel pair A-H. For example, as for the train for a base

station 112, "X" is shown under the column to which "B" and "E" w re given. This shows that th base station 112 is using channel pair "B" and "E" (g tting it blocked, base stations are one move unit and channel pair "B", and are communicating with other move units by channel pair "E"). Similarly, as for the train for a base station 120, "X" is shown under the column to which "A", "D", and "G" were given, and this shows that th base station 120 is using channel pair "A", "D", and "G." The channel pair occupancy information for the base station 122, 124, 126, 128, and 130 where everything but a base station 112 approaches, i.e., base stations, is shown similarly.

[0018] It is shown whether this data 304 of the ACO table 300 that can be channel pair used has the channel pair in which the use for a specific base station is possible. It depends for the number of channel pairs which can be used for a base station on the both sides of a channel pair which the channel pair which is carrying out base station *****, and its approaching base station are using. For example, since each channel pair A-H is used by one of the approaching base stations 120, 122, 124, 126, 128, and 130, the train of a base station 112 shows that the channel pair which a base station 112 can use now is "0." It can know by observing that the shortage of a channel pair which can be used has "X" in "H" fr m the column of each frequency channel pair in the ACO table 300 "A."

[0019] the data for the approaching base stations 120, 122, 124, 126, 128, and 130 which were shown in [which can be channel pair used] data 304 and which can be channel pair used look at the channel pair occupancy data 302 -- a **** decision cannot be made especially The data of the approaching each base stations 120, 122, 124, 126, 128, and 130 which can be channel pair used come out from the ACO table of these selves. For example, the ACO table for a base station 126 was shown in drawing 4 B. Although the ACO table for base stations 120, 122, 124, 128, and 130 is the same, those approaching base stations differ.

[0020] Next, it is located in a base station 126 and the ACO table 310 shown in drawing 4 B is explained. This ACO table 310 has the same format as the ACO table 300 of drawing 4 A. the ACO table 310 -- the channel pair in the ACO table 300 -- the channel pair occupancy data 302 for "A" to "H", and a similar channel pair -- the channel pair occupancy data 312 for "A" to "H" are included The ACO table 310 contains the data 304 in drawing 4 A which can be channel pair used, and the data 314 which can be similar channel pair used again. The difference between th ACO table for a base station 112 and the ACO table for a base station 126 is that a base station 126 has the contiguity offices 112, 124, 128, 132, 134, and 130 to a base station 112 having the contiguity offices 120, 122, 124, 126, 128, and 130.

[0021] By considering the data 314 of the ACO table 310 which can be channel pair used, it turns out that the channel pair which can use a base station 126 is one. This is understood even if it considers the column of the channel pair occupancy data 312 similarly. There is "no X" into the column of channel pair "D", and this shows that channel pair "D" is used for a base station 126, or the approaching base stations 112, 124, 128, 132, and 134 or all of 136.

[0022] The number of channel pairs which can be used for other base stations 120, 122, 124, 128, 130, 132, 134, and 136 is the method same with having decided for base stations 112 and 126, and can be determined by considering the channel pair occupancy data of those ACO tables. The number of channel pairs to each contiguity office which can be used is reported to a base station 112 from the one approaching stations 120, 122, 124, 126, 128, and 130, and is memorized as data 304 of the ACO table 300 which can be channel pair used. For example, the base station 126 has channel pair "D" which is one free channel pair, and this is used for a base station 126 or its neither of a base station approaching. In the case of the digital signal which shows the number of the channels which can be used, and this example, a base station 126 sends "1" to a move change pin center,large like the move change pin center,large 12 in drawing 1 , and sends this move change pin center,large to a base station 112 through the input port 228 which showed this digital signal to drawing 3 . A base station 112 records this information as a number "1" in the train for th base station 126 with the ACO table 300 in [which can be channel used] data 304.

[0023] Channel quota operation in the example shown in 4 from drawing 1 is explain d bel w. The channel pair acc ss demand signal from a move unit is received by the receiver 212 in drawing 3 . Filtering of this demand signal is carried out by the band pass filt r 216 adjusted to the access signal frequency channel, it is amplified by amplifier 220, and is processed by the processor 224. This processor 224 decides that the channel pair access demand was received, subsequently, is considering the train for the base station 112 in [which can be channel pair used] data 304 of the ACO table 300, and decides whether have the channel pair which can use a base station 112. You may make it consider the channel pair occupancy data 302 alternatively.

[0024] When there is a channel pair in which such use is possible, the channel pair is assigned to the move unit which required. And communication between this move unit and base station 112 is performed on the channel pair concerned. In addition, the channel occupancy data 302 and the data 304 which can be channel used are updated. The data 304 in drawing 4 A which can be channel pair used are as follows when the channel pair which can be used shows "0" in the train for a base station 112, carrying out a deer. A processor 224 considers the channel pair occupancy data 302 in the ACO table 300, in order to determine that the channel pair in which the use for a base station 112 is possible is "0", next to determine whether there is any channel pair of a single user currently used by only one of the base stations 120, 122, 124, 126, 128, and 130 which are not used by the base station 112 and approach. In this case, channel pair "D" and "F" are used by only base stations 120 and 126, respectively. This is understood by single "X" in "D" of the ACO table 300 of drawing 4 A, and the column of "F."

[0025] A processor 224 considers the data 304 which can be channel pair used, in order to determine whether there is any channel pair which can be used subsequently to either a base station 120 or the base station 126. channel pair "0 [in this case,] which can use the train for a base station 120" -- being shown -- moreover, the channel pair which can use the train for a base station 126 -- "1" is shown Therefore, even when a base station 126 is removed from channel pair "F", it will have the channel pair in which other use is possible. A processor 224 transmits a detention signal to an output port 226, in order to notify that send and a base station 112 uses channel pair "F" for a base station 126 subsequently to a move change pin center,large from now on. A base station 126 receives this detention signal from a move change pin center,large, and changes it into channel pair "D which is the channel pair which can use [other] channel pair assignment." Since change which can be set possible [channel pair occupancy and channel **** use] is reflected while assigning channel pair "F" to the move unit which required, the processor 224 of a base station 112 updates the ACO table 300. Both the base stations 112 and 126 send the data which showed the change in channel assignment to the output port 226 to the case of those corresponding output ports 112, for example, a base station, so that the approaching base station can update the ACO table of these selves. This data is sent to a move change pin center,large like the move change pin center,large 12 of drawing 1 , and this move change pin center,large sends the data concerned to the approaching suitable base station.

[0026] Next, with reference to 5, the method of this invention is explained from drawing 1 . Drawing 5 shows the flow chart which consists of blocks 402, 404, 406, 408, 410, and 412. A move channel pair access demand is received in a specific base station like a base station 112 in block 402. The data 304 in the ACO table 300 for the data 112 in the ACO table for a specific base station which can be channel pair used, for example, a base station, which can be channel pair used are checked in block 404, in order to determine whether a channel pair can be used as the base station. When there is a channel pair which can be used, one side of a channel pair in which the channel pair or use in which the use is possible is possible is assigned to a move unit in block 410. When there are two or more channel pairs which can be used, the channel pair in which specific use is possible can be assigned at random.

[0027] After a channel pair is assigned, communication between a base station and a move unit is performed on the assigned channel pair. In

block 412, it is sent out to the base station where the data about channel pair assignment approach. This approaching base station includes base stations 120, 122, 124, 126, and 130 for a base station 122. This data is digital preferably and is first sent to a base station suitable subsequently to a move change pin center,large like the move change pin center,large of drawing 1 through an output port like the output port 226 of drawing 3 . In order to determine whether there is any channel pair of a single user currently used only for one base station which is not used by this base station and approaches in block 406 when there is no channel pair which can be used for this base station as described above about the base station 112, channel pair occupancy data in a ACO table like the channel pair occupancy data 302 in a ACO table are checked. When there is such no channel pair, the loop in this method returns to block 404, and the reference of a channel pair which can be used is started again. Th access demand of the move unit known as a "call" is prevented instead of returning a loop similarly, in order to try again.

[0028] When there is such a single user's channel pair, in order that the approaching base station which is using these single users' channel pair may determine whether have the channel pair which can be used for them, next, data of a ACO table like the data 304 of drawing 4 A which can be channel pair used which can be channel pair used are checked in block 408. In having the channel pair which can use one of the base stations which these-approach, in block 410, the present base station detains the channel pair of the single user concerned, and assigns this to the move unit which required. The digital signal which clarifies using the channel pair in which this base station was detained now is sent out to the approaching base station 120, 122, 124, 126, 128, and 130, i.e., base stations, in block 412. The approaching base station 126 which was using the detained channel pair concerned previously, i.e., a base station, suspends use of the detained channel pair, i.e., channel pair "F,", and the channel pair in which the use is possible, i.e., channel pair "D", is used for it.

[0029] A ACO table is memorized in the array in well-known storage like RAM, or storage 1 table. RAM can memorize digital "1" corresponding to "X" of channel occupancy data like the channel pair occupancy data 302 shown in drawing 4 A. This table can update the position in RAM by only carrying out overwrite. RAM can memorize a number like the data 304 of drawing 4 A which can be channel used which shows the data which can be channel used again. Drawing 6 shows other examples of this invention. In this example, the ACO table information from all the base stations in a specific field is included in the move change pin center,large 540. Base stations 511, 512, 513, 514, 515, and 516 and the move change pin center,large 540 are shown in drawing 6 . This move change pin center,large 540 is further connected to many base stations of hundreds which are not illustrated or thousands. The move change pin center,large 540 contains storage 546 like RAM for memorizing the data which can be used [a data bus 542, a processor 544, channel pair occupancy, and]. Base stations 511, 512, 513, 514, and 515 and 516 are connected to the data bus 542 of a processor 544 by the bidirectional lines 531, 532, 533, 534, 535, and 536, respectively.

[0030] Drawing 6 is the example simplified at the time of merely assuming two approaching base stations that each base station has one on the right, and has others on the left, respectively. Therefore, a base station 514 has two approaching base stations 513 and 515, for example. A base station 513 has two approaching base stations 512 and 514 similarly, and a base station 515 only has two proximity offices 514 and 516. Storag 546 suits so that the set of the data related possible [the channel pair occupancy for base stations 511-516 and channel pair use] may be memorized. Each set of data is the thing of the form of the ACO table similar to the table shown in for example, drawing 4 A and 4B for each base station. For example, drawing 7 A, and 8A, 9A and 10A show the ACO table for the base stations 514, 513, 515, and 512 located in the move chang pin center,large 540 where all are single, respectively. Drawing 7 B, and 8B, 9B and 10B show the same table after channel pair assignment. About the channel pair assignment back, as channel pair assignment before was shown to drawing 11 A by each class of data and it was shown in drawing 11 B, it is a respectively single table again.

[0031] Drawing 7 A, 7B and 8A, 8B, 9A and 9B, and 10A and 10B have the ACO tables 700, 800, 900, and 100, respectively. The ACO tables 700,

800, 900, and 100 contain further the channel pair occupancy data 702, 802, 902, and 1002 and the data 704, 804, 904, and 1004 which can be channel pair used, respectively. Each ACO table contains data similar to drawing 4 A and 4B. For example, drawing 7 A shows th channel pair occupancy data 702 of three sakes, channel pair "A", "B", and "C." As explained with reference to drawing 4 A, it is shown that "X" of these columns is using the frequency channel pair in order that a base station may communicate with a move unit. drawing 7 A -- a base station 514 — a channel pair — "A" — using it -- **** — a base station 513 — a channel pair -- "B" — using it — **** -- a base station 515 — a channel pair -- using "C" is shown Drawing 7 A contains the data 704 which can be channel [which contains the number of the channels which can be used for a specific base station again] used. As for this data that can be channel used, "#" is attached. In drawing 7 A, base stations 514, 513, and 515 have "0", "1", and usable "0" channels respectively.

[0032] 10 is referred to from drawing 6 and channel pair quota operation of this invention is explained about the multiplex TABURA example in the single move change pin center,large 540. When a move unit requires access from a base station 514 to a channel pair, a base station 514 lets the bidirectional line 534 and a data bus 542 pass, and sends a demand to the processor 544 of the move change pin center,large 540. A processor 544 inspects the data for the base station 514 in storage 546 which can be channel pair used, in order to determine whether there is subsequently any channel which can be used. In multiplex TABURA, a processor 544 inspects the train for the base station 514 of the data 704 which can be channel pair used shown in drawing 7 A.

[0033] When there is a channel pair which can be used, the channel pair concerned is assigned to a base station 514 after that. However, the channel pair which can use a base station 514 is "0" in this case. Next, in order to investigate whether a processor 544 has the single user channel pair currently used by only one base station that is not used by the base station 514 and approaches, the channel pair occupancy data 702 in the ACO table 700 in drawing 7 A are checked. the channel pair of the channel pair occupancy data 702 -- the column for "B" and "C" -- a channel pair -- it is shown that "B" and "C" are used by only one base stations 513 and 515, respectively A processor 544 investigates the train for the base stations 513 and 515 of the data 704 which can be channel pair used, in order to determine whether base stations 513 and 515 have the channel pair which can use either next. The channel pair for which the data 704 which can be channel pair used can use a base station 513 is "1", and the base station 515 shows that the channel pair which can be used is "0." Therefore, a processor 544 assigns channel pair "B" to a base station 514 and the move unit which performed the demand. This quota data lets a data bus 542 and the bidirectional line 534 pass, and is s nt out to a base station 514 from a processor 54.

[0034] a base station 513 — a channel pair -- "from "B" -- it is removed, in order to determine which channel pair [" and] can be used, it is considering first the channel pair occupancy data 802 of the ACO table 800 in drawing 8 A, and a new channel pair is assigned There is "no X" in th column for channel pair "C", and this shows that channel pair "C" is not used by the present base station 513 or its approaching base stations 514 and 512. Channel pair "C" is assigned to a base station 513. Quota data let a data bus 542 and the bidirectional line 533 pass, and are sent out to a base station 513 from a processor 544.

[0035] the channel pair occupancy data 702 and 802 for the base stations 514 and 513 shown in drawing 7 A and 8A -- a channel pair — "B" assigns a base station 514 — having -- a base station 513 — a channel pair -- it removes from "B" — having -- and a channel pair -- it is changed after "C" is assigned to a base station 513 The ACO data with which it was updated after all operation of these was completed were shown in drawing 7 B and 8B. The channel pair occupancy data in the ACO table for the base station where base stations 513 and 514 approach are updated similarly. The original ACO tables 900 and 1000 for base stations 515 and 512 were shown in drawing 9 A and 10A, respectively. An updated part of these tables was shown in drawing 9 B and 10B. Data can be updated by only carrying out overwrite of the content of the

memory location in RAM.

[0036] When a base station can assign a channel pair or it is generally removed from a channel pair, it is necessary to update the channel pair occupancy data of the ACO table of all the contiguity offices of the base station concerned. Furthermore, like [when what the train of a base station 513 changed into 7B from drawing 7 A into the column of the data 704 which can be channel used is observed], when the channel which can be used for a specific base station changes, you have to update the data of the ACO table of all the contiguity offices of the base station which can be channel used. In this case, contiguity offices are base stations 514 and 512. The data for a specific base station which can be channel used can be determined by investigating channel occupancy data by the processor 544, as explained in drawing 4 A and 4B. For example, f r a base station 514, in order to determine that there is "X" in each channel column, or it follows, and there is no channel pair which can be used, the table of drawing 7 A is inspected by the processor 544. This data is memorized by the number "0", as shown in the data 704 within the train for the base station 514 of drawing 7 A.

[0037] There are usually much more base stations by which hard wiring was carried out to the move change pin center,large than the number of the approaching base stations which enclose one base station. this invention offers the dynamic channel quota technology of operating only not on the whole network but on a base station and its proximity office. although only six base stations connected to the move change pin center,large 540 were shown in drawing 6 -- such [typically] a base station -- hundreds or several — there is 1000 The data shown in drawing 7 A, 7B and 8A, 8B, 9A and 9B, and 10A and 10B can be reproduced. For example, the train for the base station 514 of drawing 7 A is the same in the train for the base station 514 of drawing 8 A. Since the table of drawing 7 A, and 8A, 9A and 10A (and these are behind changed into drawing 7 B, and 8B, 9B and 10B) is located in the same move change pin center,large, as shown in drawing 11 A and 11B, it is desirable to combine these tables with one combined table. By combining a table, the duplicate of data is cut down and substantial memory saving in a move change pin center,large is attained. In addition, channel occupancy data and the change in [which can be channel used] data can be made to require only once.

[0038] Roughly, the channel pair assignment in the case of the single table located in a single move change pin center,large is the same method as the case of multiplex TABURA located in a single move change pin center,large explained to be drawing 7 A, 7B and 8A, and 8B and 9A with reference to 9B, 10A, and 10B. However, in case the ACO TABURA information for the base station of specification [a processor 544] is inspected, a processor comes to look for the group of specific data within the combined table. For example, for a base station 514, in order to determine whether a channel can be assigned or not, in drawing 11 A and 11B, 1106 and the group of the attached data are inspected for th data which can be used [channel pair occupancy and]. The data to which 1106 was given are completely the same as the table shown in drawing 7 A. A term called [on this application and] a base station is IEEE. Communication Microcell which is indicated by "Microcells in Personal Communication Systems" published from Magazine in December, 1992 is also included. In addition, this invention is not limited to the above-mentioned example, and this invention is a various thing which this contractor can accomplish to the indicated example and which also includes change obvious.

[0039]

[Effect of the Invention] According to this invention, the effective used technology of the frequency channel in a radio communications system etc. can be offered, and efficient use of the radio frequency spectrum by the radio communication equipment is attained.

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